REMARKS/ARGUMENTS

Claims 1-6 and 8-31 are pending herein. Claims 1, 13 and 21 have been amended hereby to clarify that an outermost electrode film moves when the piezoelectric/electrostrictive element is activated. Applicants respectfully submit that support for rewritten independent claims 1, 13 and 21 can be found, for example, in paragraph [0075] of the substitute specification filed October 6, 2004 (and rewritten substitute specification paragraph [0075] submitted herewith), and that no new matter has been added.

Examiner Do is thanked for courtesies extended to Applicants' representative (Nicole J. Buckner) during the telephonic interview on May 23, 2005, during which Examiner Do indicated that any changes to the independent claims, other than incorporating features of dependent claims, would create new issues, and that an RCE would be required in order for such amendments to be entered at this stage. Accordingly, an RCE is filed herewith.

1. Applicants appreciate Examiner Do indicating that claims 3, 14 and 22 are allowed and that claims 15 and 23 would be allowed if rewritten in independent form. Claim 15 depends from claim 13, which is believed to be in condition for allowance for the reasons explained below, and claim 23 depends from claim 21, which is also believed to be in condition for allowance for the reasons explained below. In addition, Applicants respectfully submit that all claims pending herein are in condition for allowance for the reasons explained below, and respectfully request that the PTO issue a Notice of Allowance for this application in due course.

2. Claims 1, 2, 6, 8, 9, 12, 13, 16-21 and 24-31 were rejected under §103(a) over Asano in view of Takeuchi. Applicants respectfully traverse this rejection.

Independent claim 1 recites a piezoelectric/electrostrictive film type actuator including a ceramic substrate comprising a plurality of laminated thin plate layers and having a cavity formed in an internal portion thereof, and a piezoelectric/ electrostrictive device disposed on one surface of the ceramic substrate. The

piezoelectric/electrostrictive device includes a plurality of piezoelectric/electrostrictive films and electrode films which are alternately laminated such that electrode films form uppermost and lowermost layers of the piezoelectric/ electrostrictive device. The actuator is driven by displacement of the piezoelectric/ electrostrictive device such that the uppermost electrode film moves and the cavity is pressurized by deforming a part of a wall thereof with the piezoelectric/electrostrictive device.

Independent claim 13 also recites a piezoelectric/electrostrictive actuator characterized, at least in part, by a multilayered piezoelectric/electrostrictive device wherein an uppermost electrode film of the piezoelectric/electrostrictive device moves and the cavity is pressurized by deforming a part of a wall thereof.

Independent claim 21 recites a method for manufacturing a piezoelectric/ electrostrictive actuator including a piezoelectric/electrostrictive device wherein an uppermost electrode film of the piezoelectric/electrostrictive device moves, and the cavity is pressurized by deforming a part of a wall thereof with the piezoelectric/electrostrictive device.

In the present invention, the application of voltage to the electrodes generates a transverse piezoelectric effect in the piezoelectric/electrostrictive films. That is, depending upon the direction in which the voltage is applied, the piezoelectric/ electrostrictive films will either (1) contract in the transverse (e.g., horizontal or side to side) direction, causing the layered piezoelectric/electrostrictive structure (including the uppermost and lowermost electrodes) to bend downwardly or (2) expand in the transverse direction, causing the layered piezoelectric/electrostrictive structure to bend upwardly. In that manner, the uppermost electrode film of the multilayer piezoelectric/electrostrictive device according to the present invention moves as the piezoelectric/electrostrictive device is displaced to actuate the actuator and pressurize the cavity by deforming part of a wall thereof.

On the other hand, the structures of Asano operate, in large measure, based on a longitudinal piezoelectric effect. That is, upon the application of voltage to the layered piezoelectric structures shown in Asano, a longitudinal piezoelectric response is generated whereby the piezoelectric/electrostrictive layers expand or contract in the

vertical (or up-and-down) direction. This is shown, for example, in connection with Asano's Figs. 11A-11B. Further, Col. 15, lines 3-33 of Asano explain that it is the dynamic cooperation between shear mode expansion and expansion mode distortion of the piezoelectric/electrostrictive layers that cause the whole piezoelectric/ electrostrictive member to expand toward the base piezoelectric/electrostrictive layer such that the base piezoelectric/electrostrictive layer protrudes into the ink chambers to pressurize the chambers and expel the ink therefrom. See also Col. 14, line 64--Col. 15, line 51 of Asano.

Applicants respectfully submit that one of ordinary skill in the art would readily understand that, in order to obtain the desired longitudinal piezoelectric/ electrostrictive effects, Asano's structure necessarily includes the holding member 5b which acts as a restraining layer to constrain the upper electrode and piezoelectric/ electrostrictive layers from moving upward in response to an applied voltage. In fact, Col. 12, lines 12-15 of Asano even specifically point out that the "holding member 5b is fixed on the electrode layer 19a. Therefore, the top portions of the piezoelectric members 70 are held by the holding member 5b." In that manner, the uppermost electrode 19a clearly does not move in the claimed manner when Asano's piezoelectric/electrostrictive device is activated.

Applicants respectfully submit that the secondary reference does not overcome the deficiency of the primary reference, and that even if one of ordinary skill in the art combined the references in the manner suggested by the PTO, such a skilled artisan still could not have arrived at the present invention given the basic operational differences between the present invention and the applied references, and in view of the fact that Asano's device does not include an uppermost electrode that moves in the claimed manner.

For at least the foregoing reasons, Applicants respectfully submit that all claims pending herein define patentable subject matter over the applied references, and respectfully request that the above rejection be reconsidered and withdrawn.

3. Claims 4 and 5 were rejected under §103(a) over Asano in view of Nishimura, and claims 10 and 11 were similarly rejected over Asano in view of Takeuchi '857. Applicants respectfully traverse these rejections.

Claims 4, 5, 10 and 11 each depend directly from independent claim 1. Since claim 1 defines patentable subject matter over the applied references for the reasons explained above in section 2, Applicants respectfully submit that claims 4, 5, 10 and 11 likewise define patentable subject matter over the applied references by virtue of their respective dependencies from independent claim 1. Accordingly, Applicants respectfully request that the above rejection be reconsidered and withdrawn.

Examiner Do is requested to acknowledge receipt and consideration of the Identification of Copending Application filed herewith.

If Examiner Do believes that contact with Applicants' attorney would be advantageous toward the disposition of this case, he is herein requested to call Applicants' attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,

May 31, 2005
Date

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